

# **THEORETICAL AND APPLIED GENETICS**

**Vol. 58 1980**

**International Journal  
of Breeding Research and Cell Genetics**

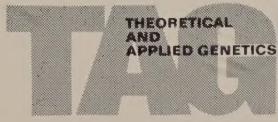
## **Editorial Board**

Managing Editor: H. F. Linskens, Nijmegen

H. Abplanalp, Davis	F. Mechelke, Stuttgart
L. Alföldi, Szeged	G. Melchers, Tübingen
R. W. Allard, Davis	B. R. Murty, New Delhi
J. S. F. Barker, Armidale	O. E. Nelson, Madison
D. K. Belyaev, Novosibirsk	P. L. Pfahler, Gainsville
Y. Y. Gleba, Kiev	R. Riley, F. R. S., London
Å. Gustafsson, Lund	A. Robertson, F. R. S., Edinburgh
R. Hagemann, Halle/S.	H. Skjervold, Vollebekk
Hu Han, Peking	P. Spiegel-Roy, Bet Dagan
G. S. Kush, Manila	H. Stubbe, Gatersleben
R. C. Lewontin, Cambridge, Mass.	K. Tsunewaki, Kyoto
W. J. Libby, Berkeley	L. D. Van Vleck, Ithaca
J. Mac Key, Uppsala	G. Wenzel, Köln
P. Maliga, Szeged	D. von Wettstein, Copenhagen



**Springer International**



Founded in 1929 under the title 'Der Züchter' as a German journal for theoretical and applied genetics and edited until 1945 by Erwin Bauer; changed from a national journal devoted almost exclusively to plant breeding to an international periodical for genetics and breeding research under the same title 'Der Züchter' in 1966; in 1968 to 'Theoretical and Applied Genetics'; edited by H. Stubbe from 1946 to 1976.

The exclusive copyright for all languages and countries, including the right for photomechanical and any other reproduction, also in micro-form, is transferred to the publisher.

The use of registered names, trademark, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Springer-Verlag Berlin · Heidelberg · New York

Printed in Germany. — © by Springer-Verlag KG Berlin · Heidelberg 1980

Beltz Offsetdruck, Hemsbach

# Table of Contents

## Originals

Adalsteinsson, S.: Establishment of Equilibrium for the Dominant Lethal Gene for Manx Taillessness in Cats 49

Arunachalem, V.: see Bandyopadhyay, A., 5

Aviv, D.; Galun, E.: Restoration of Fertility in Cytoplasmic Male Sterile (CMS) *Nicotiana sylvestris* by Fusion with X-irradiated *N. tabacum* Protoplasts 121

Bajaj, Y.P.S.; Saini, S.S.; Bidani, M.: Production of Triploid Plants from the Immature and Mature Endosperm Cultures of Rice 17

Bajaj, Y.P.S.; Singh, H.; Gosai, S.S.: Haploid Embryogenesis in Anther Cultures of Pigeon-Pea (*Cajanus cajan*) 157

Bandyopadhyay, A.; Arunachalam, V.: Are 'Multiple Cross-multiple Pollen Hybrids' an Answer for Productive Populations in *Brassica campestris* var. 'Brown Sarson'? Part 2: Evaluation of 'Mucromorphs' 5

Bansal, H.C.; Singh, R.P.; Bhaskaran, S.; Santha, I.M.; Murty, B.R.: Hybridization and Selection for Improving Seed Protein in Barley 129

Berlyn, M.B.: Isolation and Characterization of Isonicotinic Acid Hydrazide-resistant Mutants of *Nicotiana tabacum* 19

Bhaskaran, S.: see Bansal, H.C. et al., 129

Bhattacharya, P.; Sen, S.K.: Potentially of Leaf Sheath Cells for Regeneration of Rice (*Oryza sativa* L.) Plants 87

Bidani, M.: see Bajaj, Y.P.S. et al., 17

Boda, I.: see Dohy, J. et al., 1

Bouriquet, R.: see Burnouf, T., 107

Brettell, R.I.S.; Thomas, E.; Ingram, D.S.: Reversion of Texas Male-sterile Cytoplasm Maize in Culture to Give Fertile, T-toxin Resistant Plants 55

Burnouf, T.; Bouriquet, R.: Glutenin Subunits of Genetically Related European Hexaploid Wheat Cultivars: Their Relation to Bread-making Quality 107

Cahaner, A.; Hillel, J.: Estimating Heritability and Genetic Correlation Between Traits from Generations  $F_2$  and  $F_3$  of Self-fertilizing Species: A Comparision of Three Methods 33

Chaleff, R.S.: Further Characterization of Picloram-tolerant Mutants of *Nicotiana tabacum* 91

Collins, G.B.: see Keyes, G.J. et al., 265

Dickinson, H.G.: see Roberts, I.N. et al., 241

Dohy, J.; Boda, I.; Kováč, Á.: Data on the Reduction in Improving Effect of A.I. Bulls in Relation to the Genetic Trend of the Population 1

Doll, H.: see Jensen, J. et al., 27

Foster, G.G.; Maddern, R.H.; Mills, A.T.: Genetic Instability in Mass-rearing Colonies of a Sex-linked Translocation Strain of *Lucilia cuprina* (Wiedemann) (Diptera: Calliphoridae) During a Field Trial of Genetic Control 169

Flavell, R.B.: see Gerlach, W.L. et al., 97

Gallais, A.: Is Fisher's Model Necessary for the Theory of Population Improvement? 177

Galun, E.: see Aviv, D., 121

Gerlach, W.L.; Miller, T.E.; Flavell, R.B.: The Nucleous Organizers of Diploid Wheats Revealed by in Situ Hybridization 97

Giese, H.: see Jensen, J. et al., 27

Gosai, S.S.: see Bajaj, Y.P.S. et al., 157

Harris, D.L.: see Nagai, J. et al., 59

Heemert, C., van.: see Vosselman, L., 161

Hillel, J.: see Cahaner, A., 33

Hodgkin, T.: The Inheritance of Partial Self-compatibility in *Brassica oleracea* L. Inbreds Homozygous for Different S-Alleles 101

Ingram, D.S.: see Brettell, R.I.S. et al., 55

Jacobson, E.: see Feenstra, W.J., 39

Jensen, H.P.: see Jensen, J. et al., 27

Jensen, J.; Jørgensen, J.H.; Jensen, H.P.; Giese, H.; Doll, H.: Linkage of the Hordein Loci *Hor1* and *Hor2* with the Powdery Mildew Resistance Loci *Ml-k* and *Ml-a* on Barley Chromosome 5 27

Jørgensen, J.H.: see Jensen, J. et al., 27

Kang, H.; Namkoong, G.: Limits of Artificial Selection Under Unbalanced Mating Systems 181

Kawase, T.: see Kowyama, Y. et al., 149

Keyes, G.J.; Collins, G.B.; Taylor, N.L.: Genetic Variation in Tissue Cultures of Red Clover 265

Kocsis, Z.G.: see Nagy, A.H. et al., 75

Kooreef, M.; van der Veen, J.H.: Induction and Analysis of Gibberellin Sensitive Mutants in *Arabidopsis thaliana* (L.) Heynh. 257

Koster, R.: see Stettler, R.F. et al., 273

Kováč, Á.: see Dohy, J. et al., 1

Kowyama, Y.; Shimano, N.; Kawase, T.: Genetic Analysis of Incompatibility in the Diploid *Ipomoea* Species Closely Related to the Sweet Potato 149

Law, C.N.: see Payne, P.I. et al., 113

Lewis, E.J.: Chromosome Pairing in Tetraploid Hybrids Between *Lolium perenne* and *L. multiflorum* 137

Feenstra, W.J.; Jacobson, E.: Isolation of a Nitrate Reductase Deficient Mutant of *Pisum sativum* by Means of Selection for Chlorate Resistance 39

Lo Schiavo, F.; Nuti Ronchi, V.; Terzi, M.: Genetic Effects of Griseofulvin on Plant Cell Cultures 43

McAllister, A.J.: see Nagai, J. et al., 59

McMillin, D.E.: see Roupakias, D.G. et al., 211

Maddern, R.H.: see Foster, G.G. et al., 169

Maheshwari, S.C.; Tyagi, A.K.; Malhotra, K.: Induction of Haploidy from Pollen Grains in Angiosperms — the Current Status (Review) 193

Malhotra, K.: see Maheshwari, S.C. et al., 193

Miller, T.E.: see Gerlach, W.L. et al., 97

Millet, E.; Pinthus, M.J.: Genotypic Effects on the Maternal Tissues of Wheat on its Grain Weight 247

Mills, A.T.: see Foster, G.G. et al., 169

Mudd, E.E.: see Payne, P.I. et al., 113

Murty, B.R.: see Bansal, H.C. et al., 129

Nagai, J.; Harris, D.L.; McAllister, A.J. Growth.: Feed Efficiency and Lifetime Performance of Crosses Between Lines Selected for Nursing Ability and/or Adult Weight in Mice 59

Nagy, A.H.; Siddiqui, M.O.; Kocsiz, Z.G.; Vida, G.: In Vitro Dissociation-Recombination of Malate Dehydrogenase Subunits in *Corydalis solida* 75

Namkoong, G.: see Kang, H., 181

Nuti Ronchi, V.: see Lo Schiavo, F. et al., 43

Ockendon, D.J.: Distribution of S-Alleles and Breeding Structure of Cape Broccoli (*Brassica oleracea* var. 'italica') 11

Ockendon, D.J.: see Roberts, I.N. et al., 241

Payne, P.I.; Law, C.N.; Mudd, E.E.: Control by Homoeologous Group 1 Chromosomes of the High-Molecular-Weight Subunits of Glutenin, a Major Protein of Wheat Endosperm 113

Pinthus, H.J.: see Millet, E., 247

Przewoźny, T.; Schieder, O.; Wenzel, G.: Induced Mutants from Dihaploid Potatoes After Pollen Mother Cell Treatment 145

Raghuvanshi, S.S.; Singh, A.K.: Genotype Dependent Radiosensitivity of Autotetraploids in *Trigonella foenum-graecum* L. 237

Rendel, J.M.: Low Calving Rates in Brahman Cross Cattle 207

Roberts, I.N.; Stead, A.D.; Ockendon, D.J.; Dickinson, H.G.: Pollen Stigma Interactions in *Brassica oleracea* (Review) 241

Roupakias, D.G.; McMillin, D.E.; Scandalios, J.G.: Chromosomal Location of the Catalase Structural Genes in *Zea mays*, using B-A Translocations 211

Sacks, J.M.: see Shiffriss, C., 253

Santha, I.M.: see Bansal, H.C. et al., 129

Saini, S.S.: see Bajaj, Y.P.S. et al., 17

Scandalios, J.G.: see Roupakias, D.G. et al., 211

Schieder, O.: see Przewoźny, T. et al., 145

Sens, S.K.: see Bhattacharya, P., 87

Shiffriss, C.; Sacks, J.M.: The Effect of Distance Between Parents on the Yield of Sweet Pepper X Hot Pepper Hybrids, *Capsicum annuum* L. in a Single Harvest 253

Shimano, N.: see Kowyama, Y. et al., 149

Siddiqui, M.O.: see Nagy, A.H. et al., 75

Singh, A.K.: see Raghuvanshi, S.S., 237

Singh, H.: see Bajaj, Y.P.S. et al., 157

Singh, R.P.: see Bansal, H.C. et al., 129

Soyer, V.N.: Hereditary Variability of Plants Under the Action of Exogenous DNA 225

Stead, A.D.: see Roberts, I.N. et al., 241

Steenackers, V.: see Stettler, R.F. et al., 273

Stettler, R.F.; Koster, R.; Steenackers, V.: Interspecific Crossability Studies in Poplars 273

Tan, G.-Y.: see Tan, W.-K., 71

Tan, W.-K.; Tan, G.-Y.: Combining Ability Analyses of Stability Parameters and Forage Yield in Smooth Bromegrass 71

Taylor, N.L.: see Keyes, G.J. et al., 265

Terzi, M.: see Lo Schiavo, F. et al., 43

Thomas, E.: see Brettell, R.I.S. et al., 55

Tyagi, A.K.: see Maheshwari, S.C. et al., 193

van der Veen, J.H.: see Koornneef, M., 257

Vedel, F.; Lebacq, P.; Quétier, F.: Cytoplasmic DNA Variation and Relationships in Cereal Genomes 219

Vida, G.: see Nagy, A.H. et al., 75

Vosselman, L.: Fitness of a Translocation Homozygote in Cage Experiments with the Onion Fly, *Hylemya antiqua* (Meigen) 79

Vosselman, L.; Heemert, C. van.: Meiotic Disjunction and Embryonic Lethality in Sex-linked Double-translocation Heterozygous Males of the Onion Fly, *Hylemya antiqua* (Meigen) 161

Wenzel, G.: see Przewoźny, T. et al., 145

## Book Reviews

16, 32, 48, 54, 70, 86, 96, 112, 128, 144, 156, 168, 192, 236, 240, 264

## Acknowledgement

The editors thank the following external referees for their assistance

G. Barendse (Nijmegen)

D.A. Hayman (Adelaide)  
R. Hill (University Park, Penn.)

M. Carlson (Davis, Calif.)

F.W. Nicholas (Sydney)

Alice M. Evans (Cambridge)

T. Skrøppa (NISK)  
J. Sybenga (Wageningen)

P. Foley (Davis, Calif.)

C.O. Gardner (Madison, Wis.)

as well as the assistance of Mrs. Ann Jenks-Coupland and Miss H. Verhoeven (Nijmegen) at the editorial office.

Invaluable information for both  
students and researchers

E. Therman

# Human Chromosomes

Structure, Behavior, Effects

1980. 55 figures. Approx. 200 pages.  
DM 37,-; approx. US \$21.80  
ISBN 3-540-90509-X

**Contents:** Past and Future of Human Cytogenetics.— Structure of the Eukaryotic Chromosome and the Karyotype.— Mitotic Cycle and Chromosome Reproduction.— Modifications of Mitosis.— Methods in Human Cytogenetics.— Longitudinal Differentiation of Eukaryotic Chromosomes.— Chromosome Structural Abberations.— Causes of Chromosome Breaks.— The Main Features of Meiosis.— Details of Meiosis.— Meiotic Abnormalities.— Human Sex Chromosomes.— Sex Chromosome Abnormalities.— Numerically Abnormal Chromosome Constitutions in Man.— Structurally Abnormal Human Autosomes. Robertsonian Translocations.— Reciprocal Translocations.— Chromosomes and Cancer.— Mapping of Human Chromosomes.— Author Index.— Subject Index.

Intended as an introduction to human cytogenetics, **Human Chromosomes** describes the structure and behavior of chromosomes and their effects on human development. The theories and hypotheses used to explain chromosome action and interaction are presented and, when appropriate, corresponding phenomena in plants and animals are used to illustrate important points. Human genetic syndromes are described in terms of the effects of abnormal chromosome constituents on phenotype. In addition, both the mitotic and meiotic division cycles are fully explained, as are the causes of chromosomal modifications and abnormalities such as breakage, inversion and translocation. The relationship between cancer and chromosomal make-up is examined and modern attempts to map human chromosomes are described.



Springer-Verlag  
Berlin Heidelberg New York

5900/4/2h

J. SCHULZ-SCHAEFFER

# Cytogenetics

Plants, Animals, Humans

1980. Approx. 225 figs. Approx. 460 pages.  
Cloth DM 69,-; approx. US \$40.80  
ISBN 3-540-90467-0

**Contents:** Introduction.— Normal Structure of Chromosomes.— Normal Function of Chromosomes.— Normal Movement of Chromosomes.— Variation in Chromosome Types.— Variation in Chromosome Structure.— Variation in Chromosome Number.— Variation in Chromosome Function and Movement.

Chromosomes, the physical cornerstones of genetic understanding, are entities present in every organism. Their universality is the basis for this unique exposition of the principles of cytogenetics, covering all forms of life from plants to human beings.

**Cytogenetics** introduces the subject with examples from classical research and recent experimental results. The author traces the history of the field and makes frequent reference to its leading personalities in the course of the book. The unified approach, is developed in the emphasis on the central role and basic similarities of chromosomes in eukaryotes, and in the treatment of the normal and variant structure, function and movement of chromosomes. Extrachromosomal inheritance is also covered. This book fills a long-standing need for a scholarly, advanced text on the undergraduate and graduate level. It will also be welcomed by post-graduate researchers seeking a comprehensive reference for the field.



Springer-Verlag  
Berlin Heidelberg New York

5772/4/2h